

Case report

# A deceptive case of gunshot entry wounds – Beware of frangible bullets

Laurent Martrille MD<sup>a</sup>, Alain Artuso BSc<sup>a</sup>, Cristina Cattaneo MD, PhD<sup>b,\*</sup>,  
Eric Baccino MD<sup>a</sup>

<sup>a</sup> Service de Médecine Légale, Centre Hospitalier Universitaire, Hôpital Lapeyronie, Avenue du Doyen Gaston Giraud, 34295 Montpellier, Cedex 5, France

<sup>b</sup> Università Statale di Milano, Istituto di Medicina Legale, via Mangiagalli 37, 20133, Milano, Italy

Received 5 October 2005; received in revised form 7 February 2006; accepted 10 February 2006

Available online 31 October 2006

## Abstract

In December 2003, two young men decided to go shooting in the countryside near Montpellier, France. One accidentally shot the other. Upon crime scene examination and autopsy of the victim experts observed, at the right thorax, two round wounds, distanced 5 mm from each other, presenting typical characteristics of entry wounds of bullets shot from a distance. Because of the presence of two clear cut round wounds, the Procurator suspected voluntary homicide. However, thanks to the ballistics expertise, the authors concluded that all fragments belonged to a unique projectile, 22 Short caliber (Remington cartouche) of the frangible type. The barrel of the rifle intact presented an imperfection where the screw was fixed on the frontsite. The screw had obviously been changed, and the new screw was longer and therefore extended into the barrel, causing a small obstacle to the bullet when exiting the barrel. Shooting tests were performed, allowing the authors to conclude that a single bullet had fragmented before entering the body into two fragments. This led the Procurator to consider the lesions consistent with an accident.

© 2006 Elsevier Ltd and AFP. All rights reserved.

**Keywords:** Forensic pathology; Frangible bullets; Ballistics; Gunshot wounds

## 1. Introduction

In cases of gunshot injuries, collaboration between the forensic pathologist and an expert in ballistics may be of the utmost importance. Such collaboration may be even more crucial when dealing with peculiar types of situations and bullets, as in the case of frangible bullets. Frangible bullets are designed so that the bullet breaks into multiple small fragments to reduce the risk of ricocheting. In the case described in this paper, the bullets are for “sports” and designed to hit metal supports at short distances and to lose kinetic energy rapidly. Thus, these types of bullets are made so that they can actually penetrate soft tissues rapidly but fragment when they hit a harder surface such as metal or bone. This means that they may penetrate soft tissues without too much tissue damage; however, they will

fragment and disperse upon impact with metal or bone surfaces.

Very little exists in literature on their mode of fragmentation and on the wound patterns they may cause on human bodies, particularly at their site of entry.<sup>1–3</sup> And in some cases, reconstruction of what actually happened may be tricky, as shown in the present case report.

In December 2003, two young men had decided to go shooting in the countryside near Montpellier, France. The two men were friends but it was known that they sometimes had heated discussions. That evening one of the two did not return home, and 24 h later the family reported him to the authorities as missing. Shortly after, the other young man confessed that he accidentally shot his friend and that, having panicked, had hidden his body in a sewer.

The pathologist and ballistics expert were therefore called to the scene of crime once the body was found: at the right thorax, two round wounds could be easily

\* Corresponding author. Tel.: +39 0250 315678; fax: +39 0250 315724.  
E-mail address: [cristina.cattaneo@unimi.it](mailto:cristina.cattaneo@unimi.it) (C. Cattaneo).

detected, distanced 5 mm from each other, which presented typical characteristics of an entry wound of a bullet shot from a distance: bruised margins were present but no tattooing or burning. No other signs of injury were visible. In front of a case of firearm related trauma, the Procurator requested an autopsy.

## 2. Autopsy, ballistic experiments and discussion

At autopsy, a more detailed analysis of the wounds revealed the following (Fig. 1). One wound was located 3.5 cm to the right of the median line at 138 cm from the heel. It had a diameter of 6–7 mm and the abrasive collar was 2–3 mm high, slightly more pronounced in the superior right quadrant. Several linear abrasions could be observed originating at its margins, in a centrifugal fashion, ranging in length from 5 to 20 mm. The second wound was at a distance of 4 mm from the first on a sagittal plane, at 2.5 cm from the median line and 8 mm beneath the first on a horizontal plane. It had the same diameter and abrasive collar as the first wound. No tattooing or soiling were present on either wound.

X-rays performed before the autopsy showed the presence of three metal fragments, one of which clearly represented the anterior portion of a bullet, found at autopsy in the mediastinum. The other two fragments, several millimetres long, were found in the right lung and mediastinum respectively. Furthermore, during autopsy, a fragment of a gold chain was found inside the right lung. There were lacerations of the right lung and 500 ml of blood in the right hemithorax. The projectiles did not perforate the thoracic wall posteriorly. There was no bone or cartilage damage.

The ballistic analysis allowed the authors to conclude that all fragments belonged to a unique projectile, 22 Short caliber (Remington cartouche) of the frangible type. The ballistic expert thus concluded that the single bullet had

fragmented before entering the body into two further fragments which entered the body, one fragmenting further. The fragments of the bullet and the piece of gold chain thus led to the following reconstruction: the bullet's trajectory was interrupted, before hitting the thorax, by the chain; the bullet hit the chain, separated into two portions and then entered the body, leaving behind two regular wounds. This however seemed improbable due to the possible positions of the chain: either in contact with the skin (which would not explain the distant separation of the two fragments) or dangling from the neck, if the victim was bending over. Thus, following the autopsy, even with the knowledge of the ballistic expert, it was difficult to provide a scenario on how the victim had been injured, which provided the grounds for the Prosecutor to order further investigation.

The magistrate requested a judicial experiment to be performed with the same weapon in order to technically explain the presence of two lesions.



Fig. 2. To the right, one can notice the screw fixed on the frontsite of the rifle.

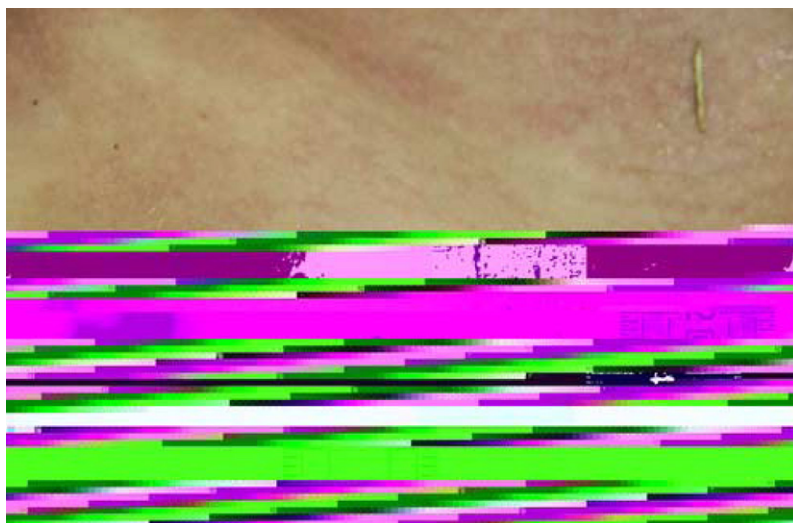


Fig. 1. Right hemithorax: gunshot entry wound consisting of two lesions.



Fig. 3. The screw can be seen extending into the barrel and creating a small obstacle for the exiting projectile.



Fig. 4. Longitudinal groove seen on a lead bullet after the test shooting with the rifle.

The same rifle (CBC) was first of all examined by the ballistics expert. The barrel presented an imperfection where the screw was fixed on the frontside of the rifle. The screw had obviously been changed, and the new screw was longer and therefore extended into the barrel, causing a small obstacle to the bullet when exiting the barrel (Fig. 2,3). Shooting tests were performed at various distances from a target (from 70 to 100 cm) with the same type of bullet (caliber 0.22 short, lead, tin and zinc).



Fig. 5. To the left, a ruptured frangible bullet after test shooting with the same rifle.

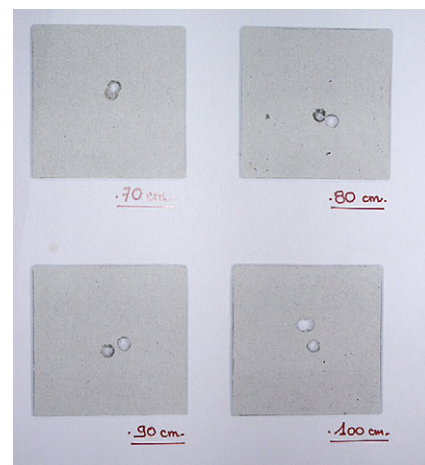


Fig. 6. Ballistics experiment showing that the distance between the two holes on the target increased as distance of the rifle from the target increased (70–100 cm).



When test shots were performed with a lead bullet, a longitudinal groove could be seen on the standard projectile (Fig. 4). When the frangible bullet was shot, it ruptured into two parts when bypassing the tip of the screw (Fig. 5). The distance between the site of impact on the target of the two fragments increased as distance from the target increased (Fig. 6).

Up to a distance of 70 cm the two holes converged on the target, at 90 cm they were at a 4 mm distance from each other, exactly like the wounds found on the victim.

Having seen the results, the Procurator decided that the lesions were consistent with one accidental shot.

Results of this study, therefore, show the importance of a ballistic expertise at the autopsy and at the scene of crime,

and in any case the crucial importance of ballistic experiments in reconstructing the mode of production of tricky projectiles.

## References

1. Graham JW, Petty CS, Flohr DM, Peterson WE. Forensic aspects of frangible bullets. *J Forensic Sci* 1966;**18**: 507–15.
2. Schyma C, Bittner M, Placidi P. The MEN frangible: study of a new bullet in gelatin. Metallwerk Elisenhutte Nassau. *Am J Forensic Med Pathol* 1997;**18**(4):325–30.
3. Kaplan J, Klose R, Fossum R, Di Maio VJ. Centerfire frangible ammunition: wounding potential and other forensic concerns. *Am J Forensic Med Pathol* 1998;**19**(4):299–302.